CLAIMS

What is claimed is:

1. A catalyst for converting NO_x in exhaust gases to NH_3 comprising:

at least one metal oxide impregnated with at least one noble metal, the metal oxide comprises at least one selected from Fe_2O_3, Cr_2O_3, MgO, La_2O_3, ZnO, TiO_x, and CeO_2, the noble metal comprising at least one selected from Pt, Pd, Ir, Rh, and Ru.

2. The catalyst of claim 1 further comprising at least one promoter metal oxide at an amount no more than 5 percent, wherein the promoter metal oxide comprises at least one selected from oxides of Fe, Zn, Cu, Mo, Co, Ti, Ni, Cr, and V.

3. The catalyst of claim 1 wherein the noble metal is present in an amount between 0 percent and 5 percent by weight.

4. The catalyst of claim 1 further comprising at least one transition metal in an amount of at most 5 percent by weight.

5. The catalyst of claim 4 wherein the at least one transition metal comprises at least one selected from Cu, Zn, Ni, Mo, Ir, Co, Fe, Cr, and Mn.

6. The catalyst of claim 1 further comprising at least one additional metal selected from alkali metals and alkaline earth metals in an amount of at most 5 percent by weight.

7. The catalyst of claim 6 wherein the at least one additional metal comprises at least one selected from Cs, K, and Ba.

8. The catalyst of claim 1 further comprising at least one rare earth oxide in an amount of at most 5 percent by weight.

9. The catalyst of claim 8 wherein the rare earth oxide comprises at least one selected from La_2O_3 and CeO_2.

10. The catalyst of claim 4 further comprising at least one additional metal selected from alkali metals and alkaline earth metals, the at least one additional metal present in an amount of at most 5 percent by weight.

11. The catalyst of claim 10 wherein the additional metal comprises at least one selected from Cs, K, and Ba.

12. The catalyst of claim 4 further comprising at least one rare earth oxide in an amount of at most 5 percent by weight.

13. The catalyst of claim 12 wherein the rare earth oxide comprises at least one selected from La_2O_3 and CeO_2.

14. The catalyst of claim 5 further comprising at least one additional metal selected from alkali metals and alkaline earth metals, the at least one additional metal present in an amount of at most 5 percent by weight.

15. The catalyst of claim 14 wherein the additional metal comprises at least one selected from Cs, K, and Ba.

16. The catalyst of claim 5 further comprising at least one rare earth oxide in an amount of at most 5 percent by weight.

17. The catalyst of claim 16 wherein the rare earth oxide comprises at least one selected from La_2O_3 and CeO_2.

18. The catalyst of claim 6 further comprising at least one rare earth oxide in an amount of at most 5 percent by weight.

19. The catalyst of claim 18 wherein the rare earth oxide comprises at least one selected from La_2O_3 and CeO_2.

20. The catalyst of claim 7 further comprising at least one rare earth oxide in an amount of at most 5 percent by weight.

21. The catalyst of claim 20 wherein the rare earth oxide comprises at least one selected from La_2O_3 and CeO_2.

22. The catalyst of claim 4 further comprising at least one additional metal and at least one rare earth oxide, the additional metal and the rare earth oxide each present in an amount of at most 5 percent, the additional metal comprising at least one selected from alkali metals and alkaline earth metals.

23. The catalyst of claim 4 further comprising at least one additional metal and at least one rare earth oxide, the additional metal and the rare earth oxide each present in an amount of at most 5 percent, the additional metal comprising at least one selected from Cs, K, and Ba.

24. The catalyst of claim 4 further comprising at least one additional metal and at least one rare earth oxide, the additional metal and the rare earth oxide each present in an amount of at most 5 percent, the additional metal comprising at least one selected from alkali metals and alkaline earth metals, the rare earth oxide comprising at least one selected from La_2O_3 and CeO_2.

25. The catalyst of claim 5 further comprising at least one additional metal and at least one rare earth oxide, the additional metal and the rare earth oxide each present in an amount of at most 5 percent, the additional metal comprising at least one selected from alkali metals and alkaline earth metals.

26. The catalyst of claim 5 further comprising at least one additional metal and at least one rare earth oxide, the additional metal and the rare earth oxide each present in an amount of at most 5 percent, the additional metal comprising at least one selected from Cs, K, and Ba.

27. The catalyst of claim 5 further comprising at least one additional metal and at least one rare earth oxide, the additional metal and the rare earth oxide each present in an amount of at most 5 percent, the additional metal comprising at least one selected from alkali metals and alkaline earth metals, the rare earth oxide comprising at least one selected from La_2O_3 and CeO_2.

28. The catalyst of claim 5 further comprising at least one additional metal and at least one rare earth oxide, the additional metal and the rare earth oxide each present in an amount of at most 5 percent, the additional metal comprising at least one selected from Cs, K, and Ba, the rare earth oxide comprising at least one selected from La_2O_3 and CeO_2.

29. A catalyst for converting NO_x in exhaust gases to NH_3 comprising:

at least one compound represented by the formula $AB_{1-x}M_xO_3$, wherein A is a rare earth metal, B is a transition metal, and M is a noble metal.

30. The catalyst of claim 29, wherein x is in a range from 0 to 0.3.

31. The catalyst of claim 29, wherein A comprises lanthanum.

32. The catalyst of claim 29, wherein B comprises manganese.

33. The catalyst of claim 29, wherein M comprises platinum.

34. The catalyst of claim 29, wherein A comprises lanthanum, B comprises manganese, and M comprises platinum.

35. A method of generating NH_3 from NO_x comprising:

passing a stream of gas which comprises NO_x, oxygen, and at least one reductant through a catalyst, wherein the catalyst comprises a metal oxide impregnated with a noble metal, the metal oxide comprising at least one selected from Fe_2O_3, Cr_2O_3, MgO, La_2O_3, ZnO, TiO_x, and CeO_2, and the noble metal comprising at least one selected from Pt, Pd, Ir, Rh, and Ru.

36. The method of claim 35, wherein the reductant comprises at least one selected from diesel, gasoline, hydrocarbons and hydrogen.

37. A method of generating NH_3 from NO_x comprising:

passing a stream of gas which comprises NO_x, oxygen, and at least one reductant through a catalyst, wherein the catalyst has a formula $AB_{1-x}M_xO_3$, where A comprises a rare earth metal, B comprises a transition metal, and M comprises a noble metal, and the noble metal comprising at least one selected from Pt, Pd, Ir, Rh, and Ru.

38. The method of claim 37, wherein the reductant comprises at least one selected from diesel, gasoline, hydrocarbons, and hydrogen.

39. A catalytic unit comprising at least one catalyst supported on a substrate, the catalyst comprising a metal oxide impregnated with a noble metal, the metal oxide comprising at lease one selected from Fe_2O_3, Cr_2O_3, MgO, La_2O_3, ZnO, TiO_x, and CeO_2, the noble metal comprising at least one selected from Pt, Pd, Ir, Rh, and Ru.

40. The catalytic unit of claim 39, wherein the catalyst further comprises at least one promoter metal oxide selected from oxides of Fe, Zn, Cu, Mo, Ti, Ni, Cr, and V.

41. A catalytic unit comprising at least one catalyst supported on a substrate, the catalyst comprising a perovskite material represented by the formula $AB_{1-x}M_xO_3$, wherein A comprises a rare earth metal, B comprises a transition metal and M comprises a noble metal selected from Pt, Pd, Ir, Rh, and Ru.